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STATE SANITATION.[1]

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State sanitation is so rapidly becoming a feature of our American Government, and the zest for health measures is becoming so great, that a consideration of certain fundamental principles by this conference of sanitary engineers should be not only appropriate but profitable. I therefore take the liberty of calling attention to some of the governmental principles which, though generally accepted, are often overlooked, and of expressing my personal opinion on certain matters of administration about which different views are held by different classes of people and in different parts of the country. What I have written is taken largely from a course of lectures on municipal engineering administration which I have given for several years at Harvard University.

Health and Comfort of the People.

By State sanitation is meant the efforts which State governments exert to prevent insanitary or uncleanly conditions of human environment which tend to impair the health or which are prejudicial to the comfort of the people. It is important, in the first place, to link these two terms together—the health and comfort of the people—for sanitation is concerned with them both. The two words are bound together in laws and legal decisions, as well as in common parlance. Nuisances are infringements against comfort as well as against health. Health, in its broadest sense, is something more than the absence of disease; it has a positive side. We measure health inversely in terms of sickness and death; we are beginning to attempt to measure health in terms of physical efficiency, capacity to work, and ability to enjoy life. The latter belong on the front side of the shield; sickness and death are for the back side. Both sides of the shield should be guarded.

Comfort has to do with the senses. Human discomfort is hard to measure, especially as people differ as to their sense reactions under different environments. These sense reactions are an important part of life; and the courts are sound when they decide that insanitary conditions are "prejudicial to health," even though the sense reaction may be merely that of a disagreeable odor. Bad odors from faulty plumbing or from badly ventilated rooms, bad odors in water supplies, bad odors from industrial plants, excessive noise, smoke in the atmosphere, oil deposits along the banks of streams and shores, and many other sense-offending conditions may be public nuisances and are properly included within the legal scope of "health and comfort of the people." I believe that sanitary engineers, who by their training are inclined to think in mathematical terms and have a penchant for measuring sanitation in terms of death rates, need particularly to be reminded of this aspect of sanitation.

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[1] Read at the Conference of State Sanitary Engineers, Boston, Mass., June 1, 1921.

Police Power and Public Benefit.

The police power is one of the inherent powers of government, that of protecting the people from dangers from within. Under it the Government may coerce the individual, take away his liberty, his property, and even his life, if necessary, in order to safeguard the safety, health, or morals of the people. Since the time of Magna Charta the English-speaking race has been preserved from tyrannous oppression, from undue exercise of the police power, by what is called "due process of law."

In the United States the police power originates in the State. It is exercised directly by the legislature, as representing the people. It may be delegated to some State department or official, to some city or city department, or to the National Government. Fundamentally, however, authority to act under the police power must be traced back to the State government.

Another function of government is that of doing for the people those things which the Government can do better, more cheaply, or more expeditiously than the people can do for themselves. These are acts for the public benefit, acts of public service, acts for the common good. They are paid for under the taxing power of government, another of its well-established functions. In recent years this idea of government has been greatly extended. Carried to the limit, it becomes paternalism or socialism. Many think it has been carried too far even in matters of health and comfort, and I am in sympathy with this view.

These two ideas of force and service represent the masculine and feminine elements of government. The best government results from a proper combination of the two. State boards of health, or departments of health as they are coming to be called, are concerned with both of these parts of government—health service and police power in behalf of health.

Functions of State Health Departments.

State boards of health perform several functions. One of these is quasi-legislative in character, carried on under authority delegated by the legislature. A State board of health may be authorized to prepare a sanitary code, plumbing regulations, rules for the protection of water supplies, rules for reporting diseases dangerous to the public health, and the like. This is done because in technical matters and in special fields where expert knowledge is needed, the legislature, composed of persons of varied attainments elected by the people, is less competent to enact such detailed legislation than a body of men selected for the special work at hand. For the best results, this delegated authority should be given to a body of men rather than to an individual. A health commissioner acting alone should not be allowed to perform functions which are legislative in character. Legislatures do well, however, to delegate authority for the preparation of rules and regulations which are essentially technical and scientific to competent boards rather than attempt to legislate directly.

A State board of health may act in a semi-judicial capacity. This authority is seen in the matter of nuisances. The board may sit as a court, hold hearings, take testimony, and render decisions. Sometimes it sits as a court of appeal. In matters of this kind a board is better than an individual, as the decisions must often be based on facts and common judgment rather than on technicalities of science or law; that is, the board is a sort of judge and jury combined.

Of course there is much work of an executive character to be done by a State department of health. Some of this is incidental to the exercise of the police power—such as laboratory work, engineering, or inspection in connection with the oversight of water supplies, stream pollution, sewage disposal, nuisances, food sanitation, sophistication of food and drugs, statistical records of sickness and death.

In addition to these regulative functions much other work of quite a different character is done; vaccines and antitoxins are made and distributed; bacteriological diagnoses of certain diseases are made; nursing services are supervised; educational activities of various sorts are carried on. These works, done chiefly for the public benefit, are largely responsible for the increasing appropriations made to State departments of health. Further expansions of efforts of this nature are being considered in some States, such as maternity benefits, dental clinics, public health nursing, and the like. In my judgment the wisdom of extending these activities is open to grave doubt. It is not at all certain that a State department of health is the organization best fitted to conduct popular education in health matters. It is certainly not the best organization to manage State hospitals and institutions. It is doubtful whether any form of activity which involves the operation of public utilities should be conducted by a State department of health. The attempt to combine the exercise of police power and the conduct of utilities for the public benefit involves administrative problems of serious character. In my opinion welfare work and public health work should be kept apart. Welfare work is done under the taxing power of government. Taxation for this purpose should be definite. If people want it or need it, let them appropriate money for it, knowing for what the money is to be spent. Let it not be confused in the public mind with money appropriated for the ordinary and well-understood police-power functions of health departments. In my opinion the time is coming when appropriations for all governmental purposes must be greatly decreased and, when that time comes, it will be important to discriminate between those governmental functions which prevent injury and those which are for the public benefit. If it comes to a choice, the latter should be sacrificed first.

There is another very important function of a State department of health which needs consideration, and that is its advisory power. This is a semi-judicial matter. Often the remedy for difficulties between contending parties is advice, not legal action. In all sorts of sanitary matters, in problems of water purification and sewage treatment, in matters of nuisances from offensive trades, a letter of advice from a State department of health which has established its reputation for fairness is often as effective as a legal order. In no way can State departments of health do more to improve sanitation than by improving the quality of their advice. Better advice and less drastic police action is, I believe, good policy; for more offenses against sanitation are due to ignorance of what to do than to willful disregard of law.

Akin to giving advice in particular matters is the setting up of standards of sanitation, of methods of procedure in all sorts of public health activities. Any such standard should be carefully worked out, chiefly with reference to local conditions applicable within the State, but also with due regard to interstate and national relations. Standard rules and regulations are useful in two ways: they promote unity, and thus simplify administration; and they tend to raise the level of administration in communities hitherto backward up to that of the standard. Standards also carry with them two dangerous tendencies: they are liable to stifle progress by making people content with the standard, and they tend to destroy local initiative and self-confidence by causing cities and towns to fall back on the State. Standards tend to destroy initiative in those who make as well as in those who follow them. I believe that the standard methods of water analysis of the American Public Health Association have been highly serviceable in raising the level of water analysis in many laboratories; but I am also convinced that they have had a bad effect on the teaching of this branch of science, students and even instructors unconsciously getting the idea that the facile use of the standard methods represents the *summum bonum* of the art. In such a matter as plumbing regulations, uniformity throughout the State is desirable in the interest of convenience and economy; yet some municipalities prefer to make, as well as to enforce, their regulations, and it is difficult to decide whether in this matter uniformity is more important than local initiative. The special plumbing board appointed by the State Health Commissioner of Massachusetts is attempting to solve the problem by making certain minimum requirements state-wide and compulsory, and by setting up in addition standard detailed rules which shall be optional for each city or town to adopt or modify. This seems to be a logical plan, as it means using the police power on a state-wide basis to prevent injury to health, and using only the advisory power in matters which relate chiefly to public benefit.

There is still another function of a State department of health which interlocks with all of the others, namely, that of inquiry, of investigation, of survey. Facts must be obtained as a basis of legislative action, judicial action, or advice, and the collection and preservation of these facts is of great importance not only to the department but to the community. The best method of preservation is by publication in annual reports. Interest in popular education in health matters has tended to turn the official reports of health departments into agents of propaganda. This is a mistake. Statistics make dry reading, but these records of facts should nevertheless form the backbone of annual reports. They are absolutely esseential as a measure of progress. It is poor economy to eliminate them, because if not published they become unavailable in later years—and perhaps lost—thereby making new and expensive compilation necessary. Decisions as to what should appear in annual reports should not be left to officials who view the matter from the standpoint of printing and who have no expert knowledge of the value of the data presented for publication.

Engineering Department.

The great shift of population from rural to urban conditions which has taken place in recent years has made the problems of public water supply and sewerage greater than ever before. The protection of water supplies against infection and the safeguarding of streams, lakes, and harbors against pollution involve engineering problems of a high order. These problems usually extend beyond municipal boundaries, and the State is the proper authority to cope with them. This is acknowledged by everybody, although it must not be forgotten that there are also interstate water pollution problems which must some day be taken up by the National Government or by river district commissions which override State lines.

A great question of administration arises in connection with these engineering matters. Ought they to be consigned to the State department of health, to the State engineer's department, if there is one, or to the water-supply commission, if there is one? Inland waters are used for public water supplies, drainage, power, recreation, fishing, and, in some instances, for irrigation and navigation. Conservation of all inland waters is of vital importance, and all of these uses must be given due consideration. It seems to me that the highest use of inland waters and the one which needs greatest consideration is that of public water supply. Drainage and water-power stand next, sometimes one, sometimes the other. The control of inland waters for water supply and drainage is an exercise of the police power in the interest of public health, and it seems to me that the control should be vested in that branch of the State government in which the police power is clearly recognized as a major function, namely, the State department of health. Water-supply commissions and State engineering departments are organized primarily to bring about public benefits, not to prevent damage being done. If the police power is exercised by them at all, it concerns safety rather than health. There is room, perhaps, for water-supply commissions in some States to appraise the water resources and to look after the uses of inland waters from the standpoint of public benefit; but to State departments of health should be given the oversight and care of the inland waters from the sanitary point of view, and this control should be recognized as paramount to all others. Hence, State boards of health need engineering departments. Most State boards of health have such departments to-day.

Besides water-supply and sewerage problems, there are other engineering matters which arise in connection with public health administration, such as problems of land drainage, of nuisances from trade waste, refuse disposal, plumbing, ventilation, rat-proofing of buildings, besides many minor engineering problems of rural sanitation. New York State has recently shifted its engineering department from the department of health to the State engineer's department. This is a regrettable action, as it takes away from the department charged with protecting the public health its strong right arm and reduces the engineering work involved in the sanitary protection of the waters to a subsidiary place in a department interested primarily in doing things for the public benefit and not acting under the police power. I hope that no other State will follow this unfortunate lapse from sound governmental principles which New York has made.

The supervision of water supplies and sewage-disposal works calls for chemical and biological as well as engineering work. These three sciences should be closely allied. Laboratory work is also required for other departments than that of engineering. The question arises, therefore, should the water and sewage laboratory be a part of the engineering department, or should all of the laboratory work be combined in a general laboratory in the interest of a unified equipment and of economical operation?

My experience in both the laboratory and administrative side has convinced me that there is little if anything, to be gained by consolidating laboratories in one department, although the physical concentration of the laboratories in one place may be a convenience and a slight economy. It is not often realized how widely and in what vital respects laboratories differ from each other. To be sure, gas and electricity and test tubes and balances are used in them all, but the work done in a laboratory of water analysis is as different from that done in a food and drug laboratory or a bacteriological diagnosis laboratory as the work of the electrical engineer is different from that of the sanitary engineer. The modern sanitary engineer, however, is trained to use the microscope and the balance as well as the transit and the level. To be of the greatest use to the sanitary engineering department the laboratory of water analysis should be a part of this department and separate in its personnel from all other laboratories. One reason for this is that more and more the importance of having water analysis conducted as field work rather than laboratory work is being appreciated. In the future the laboratories of sanitary engineering departments may be very largely headquarters for field parties who do their principal work in the field in connection with inspections. The laboratory as a tool should be always ready, quickly responsive, and the results should be available as soon as the analyses are completed. There should be no circumlocution in reporting, and the record files should be so kept as to be accessible at all times.

As to organization, my preference is for an engineering department in a State board of health, which has as its head a sanitary engineer who reports to the chief executive and who has under him an assistant engineer, a chemist, and a biologist, with such assistants for each as may be necessary. In a small department the chemical and biological work may be done by one man. In a large department one man specially trained in chemistry and another specially trained in biology are needed; but each should know the whole range of ordinary water analyses, chemical and biological, and each should be competent to act as director of the laboratory, this matter being governed by seniority. The special attainments in chemistry and biology are needed because of the unusual problems which are continually coming up for solution and in order that research may be carried on in the best way. While different forms of organization are to be expected in States which differ in size, condition, and tradition, one principle should always govern, and that is that the sanitary engineering department should have the engineering, chemical, and biological talent closely interlocked.

Permits, Approvals, Orders, Advice, and Recommendations.

The object of the sanitary engineering department is to conduct such investigations and provide such information that the State board (or department) of health may act as may be necessary to maintain and improve the cleanliness of the environment of the people. The two subjects which loom largest in the work are public water supplies and sewerage systems, with their accompanying problems of stream pollution, sewage treatment, and water purification. It is right and proper that State departments should supervise these matters; but in considering what action should be taken the two ideas of police power and public benefit must be kept clearly in mind.

In employing the police power, practice has developed several methods which demand comment. One method is that of permit. The State law may prescribe that no sewer may be built to discharge into a stream unless a permit has been received from the State department of health. This implies that there must be a subsequent inspection to make sure that the rule has been complied with. The object of the law is to prevent an injury. In plumbing, the system of permit and inspection is very common. The method is applied especially to matters in which the proscription is definite or of a routine character. It requires little special ability to carry out this method, as the rules are usually definite and infractions obvious.

Another method is that of approval. The State law may say that before works for a public water supply are constructed, the plans must be approved by the State department of health. This action demands an investigation of the particular circumstances which exist. Approval is more than permission: it implies that the plan proposed will accomplish what is intended; that it is reasonably satisfactory. Those who exercise this power of approval should realize, however, that it is an act done under the police power, and that the object of police power is to prevent public injury, not to confer a benefit. While in common usage the word "approval" carries with it the idea of commendation, legally used in connection with the police power it does not commend. The approval of a plan really means that the plan is not disapproved; that it contains no serious fault; that it "gets by." The plan may not be the best plan; yet if it will reasonably serve its purpose of preventing a public injury to health, safety, morals, or the like, it may not be disapproved under the police power of the State. Approval may also carry with it the idea of necessity. For example, in Massachusetts the taking of land to protect a public water supply must be approved by the State department of public health, the idea being that the taking should not be made unless it is necessary for the protection of the public health. There may be other special cases of approval committed to the State department of health by the legislature, but what I am emphasizing here is the fundamental idea. In geometry we learned that certain procedures were "necessary and sufficient" to prove a given theorem. Those who have to approve sanitary engineering works would do well to keep these two words in mind.

Legal approval does not necessarily carry with it the idea of general commendation, and it is somewhat unfortunate that popular usage tends to make people read this idea into the word. The owner of some proprietary device, which has been approved for a special situation, likes to advertise his device by saying, "It has received the approval of the State board of health," and the public gets the idea that the board has given the device general commendation. For this reason, letters of approval should be written with great care and with reference to possible misuse. In my opinion it is perfectly consistent for a State department of health to give approval to one plan and then proceed to advise a better one, or to reply to the applicant that approval to the plan will be given on a second request, but will be withheld pending the consideration of another suggested plan, which is deemed a better one.

We have next to consider the question of "orders" of the board of health. Here we recognize action under the police power in a drastic form. The State board of health orders that a certain thing be done in the interest of the public health. A city may be ordered to install a water purification plant or a sewage treatment works, or a manufacturer may be ordered to install devices for preventing the spread of nauseous fumes. It is necessary to be very careful in these matters not to exceed authority, not to be unjust, and not to be unduly arbitrary. It is sometimes difficult to discriminate between what is merely desirable and what is necessary. It must be remembered that the police power is not intended to bring to pass what is desirable—it is confined to what is necessary to prevent injury. Orders must be given with reference to the ability of their being carried out. There have been instances where a State board of health has ordered a municipality to install sewage treatment works, to do which would have involved borrowing money beyond the legal debt limit. Such an order is inconsistent with good government, to say the least, and is sure to raise legal complications.

Orders should be directed against the injurious result, placing the responsibility for the remedy upon the person or city causing the public injury. An order to cease committing a nuisance may be properly accompanied by advice as to how to stop the nuisance, but the latter must be regarded as advice only and there must be no implication that following the advice will relieve the wrongdoer of responsibility.

For example, it is a desirable thing for a city house to have a connection with the sewer in the street; but (unless there has been legislation to the contrary) the local board of health can not compel the house owner to make this sewer connection unless his method of disposing of the house sewage is in some way prejudicial to the public health, safety, morals, or the like. The responsibility is on the individual to abate the nuisance.

In the same way the treatment of the sewage of a city may be desirable on general sanitary principles, but (in the absence of definite legislation) the State can not compel the city to put in a disposal plant unless the existing method of disposal is doing, or is reasonably certain to do, a public injury. Even then the State should not attempt to order in detail the method of treatment, although it may *order* the nuisance to cease, and *advise* as to the best method.

In emergencies, of course, boards of health have, and ought to have, summary powers. They may have to act without legislation in the interest of preserving the health of the people. Such powers should be limited, however, to emergencies and should not be stretched too far. It is better that a community endure temporary injury than that the principles of good government be overruled.

With these conceptions of approval of plans and orders for abating nuisances, we see the important part which advice can and should play in sanitary administration. The benefits of advice depend upon the reputation which departments of health have for giving sound advice. Letters of advice should be brief, clear, and definite. They should be sent as soon as possible after the necessary information has been secured. This virtue of promptness has been sadly neglected in many States. Unless advice is backed up by reputation, it is likely not to be followed. This means that the sanitary engineer of a State should be competent, experienced, and trustworthy, a man of good judgment and abreast of the times in sanitary science. It means that his department must be well equipped to gather and preserve the necessary facts, and equipped to conduct such investigations and carry on such experimental work as may be required to give proper advice. As a result of my experience as a practicing engineer, as a public-health administrator, and as a historian of the Massachusetts State Board of Health, I am convinced that the advisory functions of a State department of health carry with them more power for bettering sanitary conditions than the more drastic actions covered by permits, approvals, and orders, although without the latter the advisory powers would lack force.

A recommendation is crystallized advice. It usually relates definitely to some policy or line of action. Unlike approval, a recommendation carries with it the idea of commendation.

I believe that there is a mistaken tendency in some States, and especially among some of the younger and less experienced officials, to exert too much authority, to try to accomplish results too quickly, to force communities to do things for benefit rather than to avoid injury, and to emphasize sanitation at the expense of other things just as important. Sanitation is not the *summum bonum* of life; it is a means to that end. If sanitation is forced much beyond the willingness of the community to support it, reaction is almost certain to follow. On the other hand, State health officials should avoid the opposite extreme very well illustrated by one of Hambone's Philosophical Meditations: "Parson tells me ah ort to be patient; but when ah tries to be patient, ah goes to sleep." State sanitary engineers must not sleep at their post—and I would like to add that I know of no class of men less likely to sleep at their post than engineers.

The Sanitary Engineer.

Finally we come to the sanitary engineer himself. Originally, and in its narrower sense, this term was applied to engineers who had to do with sewers and drains. Plumbers still style themselves sanitary engineers and have a national association of that name. But the field has expanded and now includes not only sewers, but sewage treatment, water purification, and the like. It embraces other cleansing operations such as street cleaning and refuse disposal. The sanitary engineer of to-day must have a knowledge of biology and chemistry as well as hydraulics and the art of building; he must be familiar with laboratory procedures; he must understand the relation between sanitary works and the public health and between the cost of works and sanitary value. It has been suggested that such a man should be called a public health engineer. This is certainly an appropriate title for engineers in a public health department; nevertheless, it is merely a translation of sanitary engineer, and it does not seem to be worth while to multiply names and titles without adequate reason. In fact I sometimes think it would be just as well if sanitary engineers were known merely as civil engineers, or even as engineers, just as public health officers are known as doctors. Personally I should regard the title of "Engineer Smith" as equal in honor, dignity, and importance to that of "Doctor Smith," assuming of course that the title "Engineer" represents an engineering degree, membership in a national professional society, or some other adequate standard of attainment.

From my experience, I believe that in a State health department the work of the sanitary engineer is of importance equal to that of the doctor of medicine. I can say this with perfect frankness, because no one has been more earnest than I have been in teaching biology to engineers, in securing cooperation between engineers and doctors in public health work, and in establishing schools of public health in which hygiene, preventive medicine, engineering, statistics, and administration shall be properly blended. In health department organizations engineers and physicians should be given equal standing, equal salaries, and equal ratings as to seniority, bearing in mind certain differences between administrative and executive work. The United States Government, through it's Public Health Service and the Medical Departments of the Army and Navy, would do well to set an example in this matter. The lack of recognition of equality is one of the reasons why some of our best young engineers hesitate to enter the Public Health Service to-day.

I believe that the executive positions in health departments should be under the civil service (perhaps I ought to say under a reformed civil service), and that there should be provision for retirement on pension at a certain age or after so many years of service. In consideration of this feature, the salaries paid should be somewhat lower than those paid for work of similar grade in private practice. Just as business men make more money but take greater risks, so engineers in private practice should make larger incomes while subjecting themselves more to the ups and downs of business conditions.

The great bugbear of public positions to-day is political interference. This is steadily causing a depreciation in the character of engineering service in cities and States alike. Civil service has not been an unqualified success. It has tended to keep out the unfit, but it has not increased the excellence of the service. It has made it difficult to get rid of men who are lazy, of mediocre ability, or of unpleasing personality, and pleasing personality is a quality very essential to team work in a public department. Reform in civil service is highly essential, if our health departments are to be placed on a high plane. There is another angle to the matter. If it is not right for legislators to interfere with the personnel of the executive departments, it is equally bad for the latter to interfere with legislative matters. Unfortunately, there are too many examples of this practice.

More than all else it is important that engineers pay greater attention to their own ability. The young graduate of an engineering school is a fledgling; he can fly a little, but not far or well. He needs practice; he needs contact with engineering problems; he needs much study. The engineer must study throughout his life. Self-made engineers, like the engineers of the past, developed habits of study which never left them. College graduates too often think that their studies are over when they are graduated. When an engineer retires for age he may cease studying, but not until then. William Mulholland, the self-made engineer who built the great Los Angeles Aqueduct, told me recently that he takes fifteen magazines and reads them. Sanitary engineers must read much, because their field is wide and embraces many sciences.

In States where appropriations are limited, the attempt to get proper men for the position of sanitary engineer is met in various ways. One way is to employ an engineer on half time, allowing him to engage in private practice. This I believe to be a thoroughly iniquitous arrangement, unless the engineer conscientiously refuses to do any private work whatsoever within the limits of the State. Even then the arrangement is not altogether satisfactory, because it is difficult for the engineer to be on hand at the right time. Another method is to employ an engineer on half time, letting him combine State work with teaching. This is less objectionable, but not altogether satisfactory. A full-time sanitary engineer is as much needed as a full-time health officer. The job is big enough for a whole man and for the best man obtainable. In my opinion, it is better to obtain a lower priced full-time man than a higher priced half-time man. The appointee then has a definite piece of work for which he is personally responsible. This responsibility tends to make him do his best; whereas if he is carrying on two jobs at the same time, there is danger that he may slight both of them, unless he is a man of exceptional ability and force of character.

Even if a sanitary engineer gives what is practically his whole time to a State department of health, he should not allow himself to engage in private practice within the State, for sooner or later he is sure to find himself in a situation which will seriously compromise his reputation. He may, however, accept occasional consulting engagements outside of the State without overstepping the limits of professional etiquette. Professional ethics among engineers is something to be cultivated and guarded with jealous care. Licensing of engineers by the State or the setting up of any artificial standards will never accomplish for the profession what the engineers can do for themselves if they will.

There seems to be one solution of this problem which nowadays is seldom tried, namely, to reinforce the official sanitary engineer with a consulting engineer who is either regularly retained or called upon for advice in particular cases. The Massachusetts State Board of Health had this practice at one time, and some of our most eminent engineers, chemists, and biologists have served the State in a consulting capacity. This practice, in my opinion, should be renewed and extended. It would have several advantages. In the first place, it would greatly strengthen the reputation of the State department of health and give its letters of advice greater weight. It would make it possible for the smaller States to have as good advice as the larger States. In case of controversies, it would strengthen the State in its contentions. It would tend to soften one of the sharp corners which result from laws requiring plans to be approved. At the present time it so happens that many of the engineers engaged in private practice are older and more competent than the State engineer who must pass upon the plans submitted. The less experienced State engineer may, however, understand local conditions better than the designing engineer who has made the plans. Under these conditions, refusal to approve the plans creates a situation disagreeable to both parties. If, however, the State department of health had a consulting engineer, doubtful plans could be approved or disapproved with better grace and a greater feeling of security that the proper result had been reached.

There is also a present-day tendency for engineers in high positions to do too much work by proxy. Accustomed to assistants, they have stenographers to write their letters and young engineers to make their computations. Many of our modern methods, thought to be so efficient, are not so, because they are turning our chief engineers into routine executives and are confusing administrative and executive work. Our chief engineers and consulting engineers ought to do more personal engineering work and leave more of the routine work to others. Engineers who cease to make personal studies run downhill rapidly.

Engineers who enter the public service under present conditions do so at a personal sacrifice. I believe that public service ought to involve personal sacrifice. Young men entering the service should understand this clearly. The sacrifice is recognized in times of war; it should be recognized in times of peace. Public service means doing for others. It is only by the recognition of this principle that our health departments will be filled with the right kind of men—men who are not there for gain, for large salaries, or easy work. Personally I know of no better way for a young man to serve his day and generation than to become an engineer, learn how to employ the great forces of nature for the use and convenience of man, and then enter the public service and spend his life for the public good. It does not mean wealth; it means hard work and many conflicts with the powers of evil. It may not always mean public recognition and honor; but it does mean much personal satisfaction and many pleasures by the way.